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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/605,304

09/22/2003

TZU-CHING TSAI

11080-US-PA

2303

31561

7590

12/14/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE

7 FLOOR-1, NO. 100

ROOSEVELT ROAD, SECTION 2

TAIPEI, 100

TAIWAN

EXAMINER

GARCIA, JOANNIE A

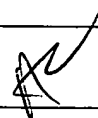
ART UNIT

PAPER NUMBER

2823

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/605,304	<b>Applicant(s)</b> TSAI ET AL.	
	<b>Examiner</b> Joannie A Garcia	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-13 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 2 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

The disclosure is objected to because of the following informalities: On paragraph 0011, line 3, "10a8" after "the doped layer", should be replaced with --108a--.

Appropriate correction is required.

Claims 1-12 are objected to because of the following informalities: In claim 1, line 6, "a forming material layer", after "deep trench and", should be replaced with --forming a material layer--. Appropriate correction is required.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 5-8, 10-13, 15, and 18-20, are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (US 2004/0214390 A1).

Chen et al discloses providing a substrate 100, wherein the substrate is already formed with a deep trench 104 (Figure 1a, and Paragraphs 0022-0023), forming a doped layer 108 on a surface at a bottom of the deep trench and forming a material layer 110 on the doped layer (Figures 1b-1c), wherein forming the doped layer on the deep trench and forming the material layer on the doped layer further comprises forming a conformal doped layer such as arsenic silicate glass above the substrate and on the surface of the deep trench (Figure 1b, and Paragraphs 0025, and 0026), filling the material layer such as polysilicon in the deep trench,

wherein the material layer does not completely fill the deep trench (Figure 1c, and Paragraph 0026), and removing the conformal doped layer that is not covered by the material layer (Figure 1d), forming a passivation layer 112' on a sidewall at a top of the deep trench that is not covered by the material layer (Figure 1e), wherein forming the material layer further comprises forming a conformal passivation layer 112 above the substrate and on the surface of the deep trench, covering the material layer and the doped layer (Figure 1d, and Paragraph 0027), and etching back the conformal passivation layer to form the passivation layer on the sidewall at the top of the deep trench that is not covered by the material layer (Figure 1e, and Paragraph 0029), and wherein the conformal passivation layer is formed by depositing a silicon nitride material to a thickness of 200 angstroms (Paragraph 0027), removing the material layer (Figure 1f, and Paragraph 0030), performing a thermal process at a temperature of 1000 °C to drive-in dopants in the doped layer to the substrate to form a doped region 111 and inducing a reaction between the doped layer and the substrate to form an oxide layer 111' (Figure 1f, and Paragraphs 0028, and 0031), and removing the oxide layer (Figure 1g, and Paragraph 0032).

Claims 4, 9, 16, and 17, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al as applied to claims 1, 3, 5-8, 10-13, 15, and 18-20, above, and further in view of the following comments.

Chen et al discloses the claimed invention except for time duration of the thermal process, and thickness of the substrate being consumed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to determine a suitable time duration for the thermal process, and consumed substrate thickness, since it has been held that

where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In addition, the selection of time duration and consumed substrate thickness, is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and *In re Aller*, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed duration of time and consumed substrate thickness, or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen time durations, and consumed substrate thickness, or upon another variable recited in a claim, the Applicant must show that the chosen time duration are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claim 2 would be allowable if rewritten to overcome the objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

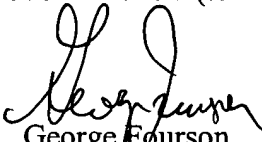
Art Unit: 2823

Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joannie García whose telephone number is (571) 272-1861. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
George Fourson  
Primary Examiner  
Art Unit 2823



JAG

December 9, 2004

GFourson  
Primary Examiner